Small Business Innovation Research

Low Cost, High Performance Cryogenic Heat Exchanger

Creare, Inc.

Hanover, NH

INNOVATION

Developed lightweight, compact Radial Flow Heat Exchanger (RFHX) for space and aircraft cryocooler applications.

ACCOMPLISHMENTS

- Construction and fabrication methods enable small size, light weight, and high performance compared to the state-of-the-art Slotted Plate Heat Exchanger.
- Design models predict that a multi-module RFHX can achieve a thermal effectiveness of 0.99 with a mass of only 2.5 kg and a fractional pressure drop of only 6 percent.

GOVERNMENT/SCIENCE APPLICATIONS

- Phase III funding from GSFC and the Air Force Research Lab for the development of the RFHX to provide high-performance recuperative heat exchangers for future turbo-Brayton cryocoolers.
- Air Force has sponsored development of high-capacity recuperators based on RFHX technology to provide compact cryogenic coolers for air separation in large transport aircraft and to supply liquid oxygen for medevac units.
- JSC providing funding using RFHX technology for service in the advanced Trace Contaminant Control System (TCCS) for the International Space Station.
- Developing RFHX using advanced materials that meets the requirements for sensor cooling in the NASA Next Generation Space Telescope (NGST).

Radial Flow Heat Exchanger

COMMERCIAL APPLICATIONS

- Additional applications include cryocoolers for reconnaissance and missile defense systems, oxygen generating systems for medical and aircraft applications, laboratory- and industrial-scale cryogenic refrigeration and liquefacation systems, and oxygen generating systems for field hospitals.

Points of Contact:
- NASA - Mike Rhee; 301.286.5788
- Creare - Mike Izenson; 603.643.3800

Goddard Space Flight Center

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